**Common peroneal nerve palsy: Nerve reconstruction Vs tendon transfer**

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Inferior limb palsy are less frequent if compared with those occurred in upper limb, but are more invalidating of those occurred in upper extremity. Drop-foot, which is a consequence of common peroneal nerve (CPN) palsy, is a disabling condition created by the pull of the posterior tibialis tendon (PTT) and the paralyzed anterior tibialis tendon (ATT) and peroneal tendons, leading to a supinated equinovarus foot deformity, which is characterized by the droop of the digits, producing the well-recognized steppage gait.

CPN palsy accounts for 15% of all peripheral nerve injuries. This is related to the peculiar anatomical features of the nerve at the knee level, as its superficial location overlying the bony prominence of fibular head, as the position of the nerve which is tethered distally by motor branches and by the fibrous arcade at the fibula neck proximally, and finally to the low ratio of epineural to fascicular cross-sectional area at the knee level.

CPN is mainly injured at the distal third of the thigh or at the knee level and various types of injuries may be encountered as during knee dislocation in high energy trauma, or the nerve can be stretched, lacerated, or contused during fractures, or during surgical procedures producing iatrogenic lesion, or damaged in gun shot wounds, or entrapped at the fibrous arcade of the peroneal longus or extensor digitorum communis muscle, or compressed by tumors or ganglia.

According to the type of damage, recovery may be spontaneous, mainly in minor compression and traction damage as may happen during some surgical procedures, or during compression by cast. Conversely, recovery is difficult and rare in more severe traumatic traction, entrapment and neural ganglia. Functional recovery after graft repair depends largely from the causative mechanism, the extend of nerve damage, the severity of injury and therefore upon the length of the grafts.

In entrapment and neural ganglia, prognosis is generally good and excellent if surgery is performed early and it is radical.

In post-traumatic lesion, prognosis depends on the type of treatment, in fact if neurolysis is simply needed, good and excellent results may be expected in 80-90% of cases, except when intraneural damage if found. If direct suture is needed, good result may be achieved in 82% of cases especially in sharp lesions and when surgery is performed early. If nerve grafts are needed, results depend upon nerve gap. If the gap is less than 6 cm, good results may reach the 75% of cases, if between 6 and 12 cm good results lowers to 35% of cases, and they are less than 14% when nerve gap is more than 12 cm. In these two latter gap categories (between 6 and 12 cm and over 12 cm), nerve reconstruction presents disappointing results and other techniques should be taken into consideration.

For the cases in which the primary nerve repair does not produce muscle reinnervation or the nerve reconstruction is not indicated, a dynamic tendon transposition may be a plausible surgical option for the restoration of functional dorsiflexion. In an effort to find a solution to the major disadvantage of the numerous techniques, which were developed from the original procedure presented by Codivilla and Putti, we use the anterior tibialis tendon (ATT) rerouting technique. We reroute the ATT on the dorsum of the tarsus by drilling a transosseous tunnel from the first to the third cuneiform. With this approach, we create a new tendon origin at the level of the third cuneiform. The ATT is then passed under the extensor retinaculum, reaching the distal third of the leg. The posterior tibialis tendon (PTT) and the flexor digitorum longus (FDL) tendon are transferred through the anterior aspect of the interosseous membrane. A tendon-to-tendon suture is performed between the ATT and PTT using the Pulvertaft technique, and similarly, the FDL tendon is sutured end-to-side to the extensor digitorum longus and extensor hallucis longus tendons. Originating a new tendon at the tarsus and the positioning of the recipient ATT in closer proximity to the donor PTT are novel aspects of this technique. These modifications produce a sufficient tendon length, which would permit an easy tendon-to-tendon suture at the distal third of the leg. This, in turn, eliminates the PTT length-related problems associated with other techniques. The transfer of the FDL tendon, which is associated with a straight line of pull, improves the power of foot dorsiflexion not only avoiding the drop of toes but also allowing the voluntary dorsiflexion of digits.

According to author experience, when nerve gap is between 6 maximum 8 cm within 6 maximum 9 months after trauma, in patients less than 40 years old, nerve reconstruction should be performed.

In the others cases, tendon transfer should be considered.

Disadvantages of nerve reconstruction may be represented by the uncertain reinnervation, by the long time to recovery (up to two years) and during this time, ankle stiffness may develop. In case of failure patients generally refuse tendon transfer and accept both palsy and ankle foot orthosis.

Tendon transfer is becoming the preferred procedure as opposed to nerve reconstruction due to its shorter recovery time. The procedure is surgically demanding, and the risk of failure is high if performed in inappropriate cases or if indication is not accurate. The final results largely depend on patient cooperation and the surgeon’s understanding of the procedure.